FOREWORD

The Soil Conservation Service, U.S. Department of Agriculture, prepared the information in this flood plain management report. Officials of the Vermont Department of Water Resources, the Windham County Natural Resources Conservation District, and the Town of Grafton cooperated in compiling the report.

The flood hazard and land use information should serve as a technical base for flood plain management programs. State and local governments, as well as the public, will benefit from knowledge of flood information on the Saxtons River and its tributaries. A program to minimize future flood damages can be developed from this information. Describing the legal aspects and methods of conducting management programs is not within the scope of this report. However, some general recommendations are included.

We thank the many people who contributed information for the study. We also thank the landowners who gave permission for field surveys.

TABLE OF CONTENTS

FLOOD PLAIN MANAGEMENT STUDY
TOWN OF GRAFTON
WINDHAM COUNTY, VERMONT

Introduction

The Vermont Agency of Environmental Conservation (VT-AEC), the Town of Grafton, and the Windham County Natural Resources Conservation District (NRCD) coordinated in this flood plain management study and report preparation. The VT-AEC provided overall coordination for the study and assisted with the field surveys. The Town of Grafton has provided public participation, made necessary arrangements for field surveys, provided base maps, and duplicated and distributed this report. The NRCD has also cooperated in the effort.

These state and local entities requested the flood plain management study to provide detailed flood frequency characteristics and other analyses for a major portion of the flood plain system within the Town of Grafton. The town was experiencing increasing pressures for development of flood prone areas and lacked detailed flood plain information.

The U. S. Department of Agriculture, Soil Conservation Service (SCS) participated in the study and preparation of this report under the authorities of Section 6, Public Law 83-566, as amended; Executive Order 11988, Flood Plain Management, dated May 24, 1977; Recommendation 3, a Uniform National Program for Flood Plain Management, Water Resources Council, September 1979; and U. S. Department of Agriculture's Secretary's Memorandum Nos. 1606 and 1607, November 7, 1966.

The Vermont Department of Water Resources, a department within the VT-AEC, is responsible for making studies, policies, and plans for the use, development, and protection of Vermont's water resources under Chapter 37, Title 10, of the Vermont Statutes Annotated.

This report provides a description of the flood plain system including its natural values, flood-frequency-stage-inundation relationships, and alternatives for flood plain management consideration.

Flood runoff volumes and flow rates were developed along the Saxtons River and its tributaries using the SCS computer model described in Technical Release No. 20 (Reference No. 8). Flow-frequency values from this hydrologic model were adjusted as necessary in analyzing them along with values from similar gaged watersheds. Flood plain geometry and hydraulic characteristics were acquired by field surveys. Flood-frequency surfaces were computed using the adjusted flows from the hydrologic model as inputs to water surface profile development, using the Soil Conservation Service's Technical Release No. 61 (Reference No. 9).

Results were checked against known high water marks at selected locations. The products of these analyses are the basis for much of the boundary, elevation and profile information contained in this report. This report's information reflects coordination with evaluations made by others along the Saxtons River.

The flood stages provided for selected storm frequencies should be considered as minimum elevations for the prescribed uses of this report. Certain indeterminate factors and conditions affecting future flood flows could cause higher flood stages than indicated. These include ice and debris, clogging of bridges and culverts, sediment, ice and debris jams along the channel and flood plain, and changes in the vegetative character of the channels and flood plain.

Study Area Description

This report provides detailed information on 8.3 miles of the Saxtons River, 1.8 miles of the South Branch of the Saxtons River, and 0.1 mile of Hinckley Brook within the town of Grafton, Vermont. The Sheet Index Map provides locations of these studied stream reaches.

Drainage areas of the streams studied are in square miles: Saxtons River at Rockingham Town Line - 43.4, South Branch of Saxtons River at its outlet - 19.8, and Hinckley Brook at its outlet - 1.7. The study area is located in U.S. Geological Survey Hydrologic Unit 01080104020.

The Town of Grafton is located at 43^{o} - 10' north latitude, 72^{o} - 38' longitude. It has a cool, moist climate. Average annual precipitation is 43 inches, which includes an average of 90 inches of snowfall. Of this about 20 inches leaves the land as surface runoff. The mean annual temperature is 44^{o} F with a winter minimum of 35^{o} F and a summer maximum of 90^{o} F.

Natural and Beneficial Values

The flood plain study areas discussed in this report have several natural and beneficial values. Fisheries, wetlands, aquifer recharge areas, and agriculture are all beneficial natural components of the flood plain.

The subject stream segments of the South Branch of the Saxtons River, and the Saxtons River are tributaries of the Connecticut River. The streams are generally well shaded and fast moving in the study reaches. The Vermont Guide to Fishing and the Vermont Stream Survey note that Brown and Brook trout are found in abundance in the study area.

The interface between the river and the adjoining forests and fields is an important wildlife habitat zone and travel lane. A diversity of wildlife species frequent such areas as they provide a wide diversity of food sources and habitat types. Within a short distance of the study area, the State of Vermont has identified several deer wintering yards. Overall the stream, flood plain, and adjoining land areas provide a diversity of high quality wildlife habitat.

The flood plains of the study area are generally narrow and contain only minor wetland areas. Soils immediately adjacent to the stream are of the Colton, Adams, Podunk association and are generally deep and well drained. These soils have the potential to contribute to aquifer recharge in the area.

Only minor areas of the flood plain are used for agriculture but such a landuse is most appropriate as these undeveloped lands are an effective dissipater of flood flows. The areas used for agriculture are also important in providing a forage/feed source to related farm operations.

Flood Problems

The Town of Grafton has experienced severe flooding this century during March 1913, November 1927, March 1936, September 1938, June 1973 and August 1976. The villages of Houghtonville, Grafton, and Cambridgeport, all within the Town of Grafton, experienced major streambank and property damage during these floods.

Fifteen year round homes, seven seasonal residences and two commercial sites are flooded occasionally. There are 24 other buildings of various types and use in the flood plain. Flooding ranges from minor damage of basements to major first floor inundation. The two commercial sites are in the floodway. Flooding also damages agricultural land, woodland, town and state highways. The appendix contains flood hazard area photomaps which outline the potential flooded areas. Table 1 provides a further description of the flood hazard.

Figures 1 through 4 show the surface height of the 100-year flood at selected locations.

Table 1 Characteristics of Potential Flood Damages, Areas Studied in Town of Grafton, Vermont

Stream	Type of Drainage	Acres by Flood Frequency 100-Year	500-Year
Saxtons River	Agricultural	100	109
	Woodland	59	66
	Roads, bridges and buildings	31	38
	Subtotal	190	213
South Branch	Agricultural	53	55
	Woodland	8	8
	Roads, bridges and buildings	6	7
	Subtotal	67	70
Hinckley Brook (included with Saxtons River)			
TOTAL STUDY AREA	Agricultural	153	164
	Woodland	67	74
	Roads, bridges and buildings	37	45
	Total	257	283

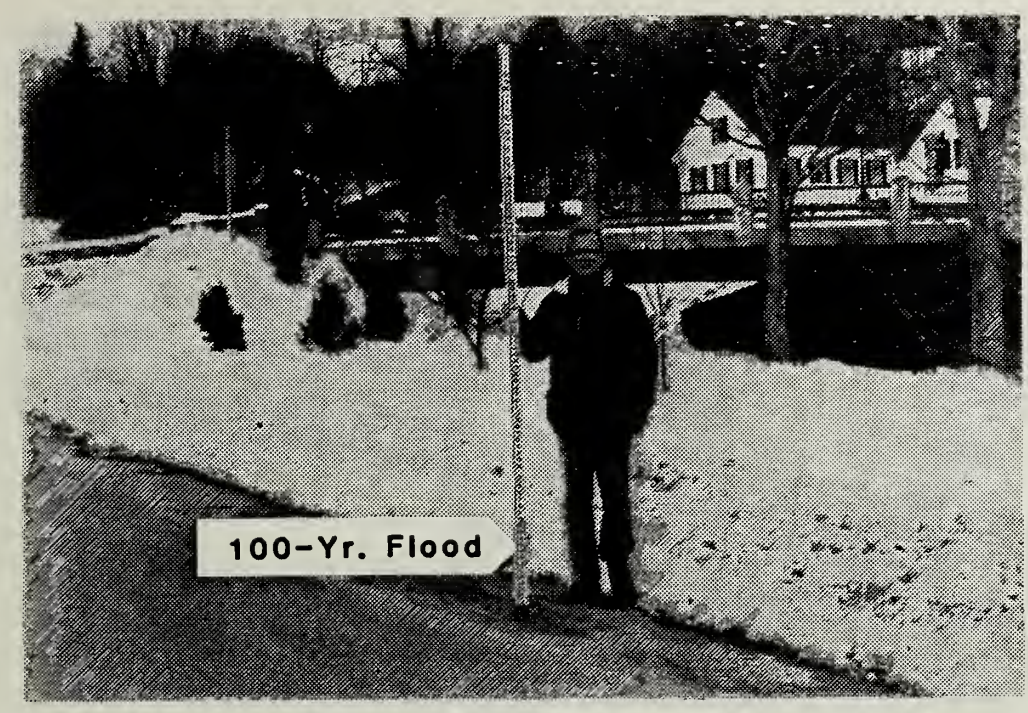


Figure 1. South of bridge on Route 121 over the Saxtons River in Grafton Village.
Cross Section SR27

Figure 2. West side of Route 121, 1.9 miles east of Grafton Village.
Cross Section SR36

Figure 3. West end of bridge over Saxtons River at edge of Route 121.
Cross Section SR22

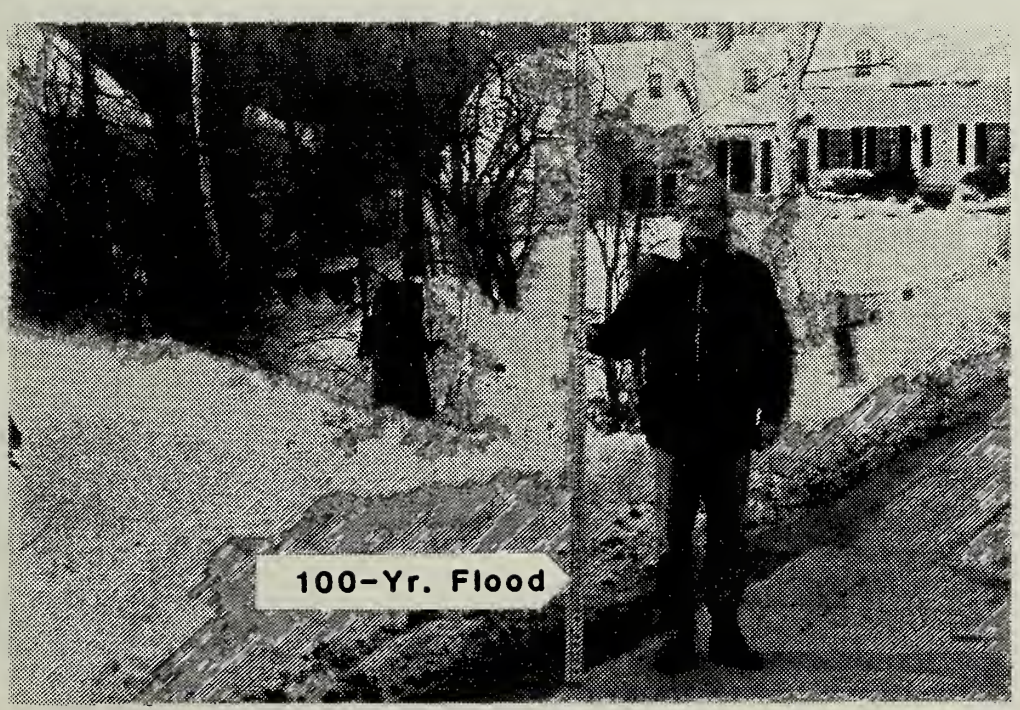


Figure 4. East end of bridge over Hinkley Brook.
Cross Section HB1

Depths of flow along the tributaries for the 100-year flood range from about five feet to fifteen feet. The 100-year flood velocities in the channel range from 4.5 to 13.5 feet per second. These values were determined under the assumption that bridges, culverts and other flow restrictions are clear of debris.

The hydrologic conditions are expected to remain about the same for the foreseeable future. Limited development is occurring primarily in the lower reaches of the tributaries where effects on stream flooding are generally less. Unless managed development of the flood plain is implemented, the possibility of raised flood heights from flood plain encroachment could occur. This, as well as employment of conservation practices for protection against increasing runoff from headwater development, should be of primary concern to the townspeople in the future.

Existing Flood Plain Management

In Vermont, municipalities have the authority to regulate development in flood hazard areas under Title 24 VSA chapter 91. Title 10 VSA chapter 32 authorizes the Secretary of the Agency of Environmental Conservation to designate flood hazard areas and to assist the towns with flood hazard regulations. Title 25 VSA subsection 4409 requires towns to submit a report to Water Resources before issuing a permit for development in a designated flood hazard area.

Several other Laws and regulations administered by the state contain special requirements for development in flood hazard areas. Some of these are:

Act 250 (10 VSA chapter 151) administered by the Environmental Board and District Environmental Commissions;

Health Regulations administered by the Protection Division of the Agency of Environmental Conservation;

Storage of Flammable Liquids (20 VSA section 2721) administered by the State Fire Marshal;

Stream Alteration (10 VSA chapter 28) administered by the Department of Water Resources;

Dam Construction (10 VSA chapter 29) administered by the Department of Water Resources.

The Town of Grafton has an interim flood plain zoning ordinance in effect. However, the available mapping is not adequate to properly administer the ordinance.

Alternatives for Flood Plain Management

Present Condition

Allowing the current flooding situation to continue is a possible although undesirable alternative. Essentially the flood damages enumerated in table 1 would continue. Lack of control over development in the flood plain could result in further encroachment by development with the accompanying increases in flood damages.

Land Treatment

Inclusion of conservation practices for erosion and runoff control in new developments and building areas would help to assure protection against induced flooding from this source. Most of the development now is occurring in the lower extremities of the tributaries where control of erosion and sedimentation (to protect stream capacities) may be more important than runoff control.

Nonstructural Measures

Floodproofing of buildings and other high value property in the flood plain is a particularly appropriate measure for reducing losses to individual properties. A flood warning system or plan would be of limited value as a nonstructural measure because the time to respond with emergency protection activities is only a matter of less than 2 hours. Relocation of some residences and buildings or acquisition to eliminate risks may be appropriate in some instances. The Town of Grafton plans to adopt formal flood plain regulations which will be very helpful in assuring development in the future will not sustain frequent, severe flood losses. The national flood insurance program has made affordable flood insurance available to flood-prone property owners through private underwriters. Owners of existing flood prone property should consider flood insurance as a means of reducing their flood loss risk. Other nonstructural approaches such as emergency preparedness and building or development codes should be considered.

Structural Measures

There appears to be little opportunity for modifying floods through headwater impoundments (dams) or channel enlargement. Diking of clustered development may be is a possibility. This alternative would require intensive study to determine cost-benefit relationships.

Combinations of Alternatives

Several of the above alternatives could be combined in a number of ways to provide a plan to address the flooding problem.

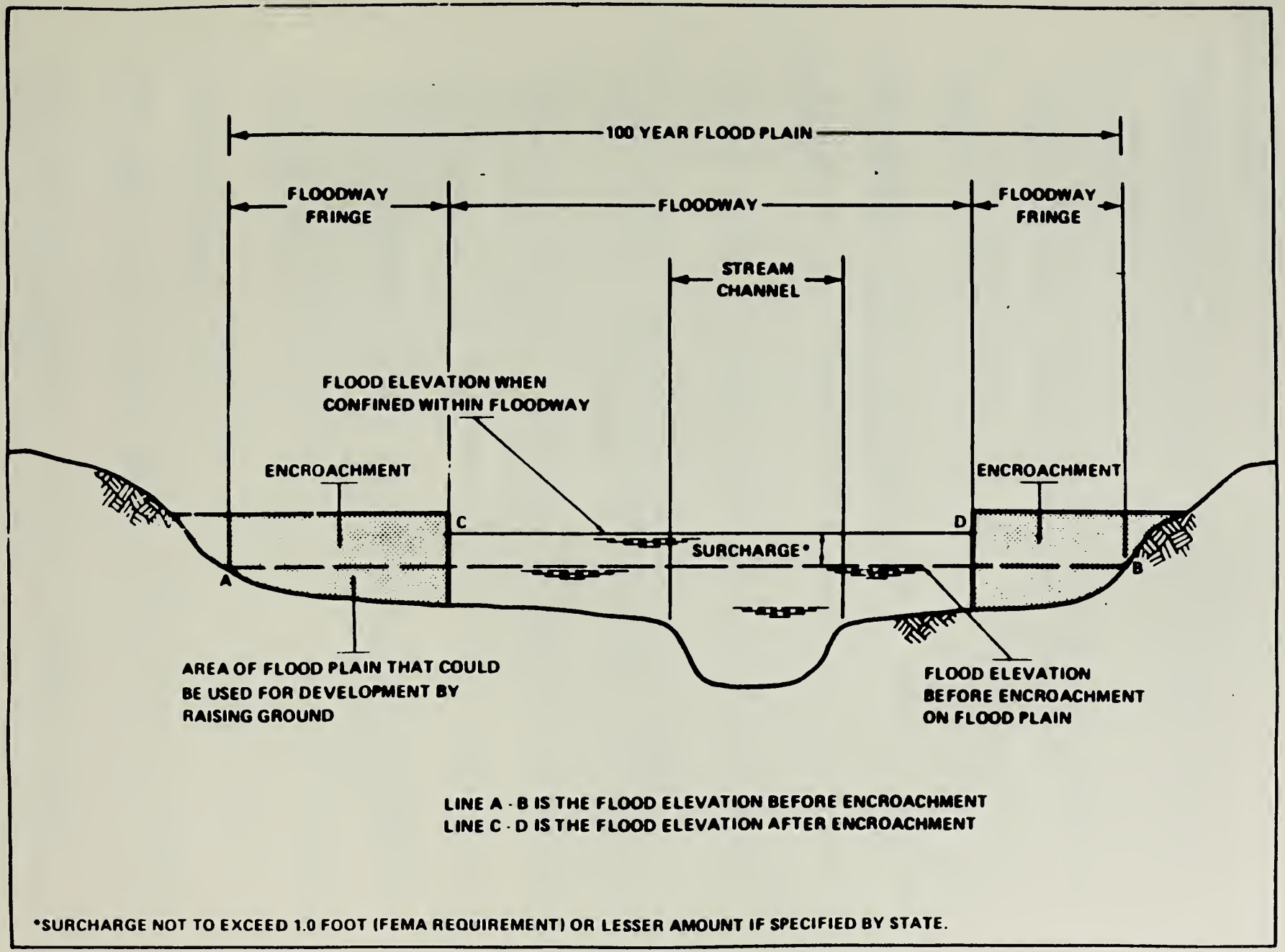
Floodway Determination

Any development activity that raises the elevation of the flood plain will restrict flow and increase flood heights. Communities have found benefits from allowing carefully controlled development to occur in the flood plain fringe provided resulting increases in flood hazard can be tolerated. The National Flood Insurance Administration uses the concept of floodway as an aid in evaluating such situations. This concept partitions the 100-year flood area into a floodway and a floodway fringe. The floodway fringe is the portion of the flood plain that can be completely obstructed without increasing the water-surface elevation of the 100-year flood more than one foot at any point. The floodway is the remaining portion of the channel and the flood plain (see Figure 5).

This theoretical floodway data has been provided the Town of Grafton on work sheets as a separate entity from this report.

Flood Hazard Maps

The photomaps entitled "Flood Hazard Areas" (sheets 1 through 6 in Appendix A) show the 100-year and 500-year flood areas. These areas are depicted based on present land use and management conditions. The flood boundaries show the approximate location on the ground for general reference purposes. The 500-year flood boundary is to be interpreted as being close to the 100-year flood boundary where it is not separately mapped. The reason for this is that the valley side slopes along many reaches of stream are steep and the map scale small. This yields a 500-year boundary which is nearly contiguous with the 100-year boundary. Along such reaches it is therefore not mapped. If a more precise location of a flood boundary is needed, one can reference the desired location and frequency-elevation on the flood profiles printed on the reverse side of the photomap and establish the boundary on the ground by field survey. Appendix A provides a tabulation of elevation reference marks that can be used in connection with this activity.



FLOODWAY SCHEMATIC

Figure 5

Glossary of Terms

backwater. High water caused by downstream obstruction or restriction, or by high stage on an intersecting stream.

BM. Benchmark of established elevation used for vertical reference.

bottom of culvert. Elevation of the lowest flow surface of a culvert (or pipe) through which flood flows pass.

cfs. Cubic feet per second - a unit of discharge that is equal to the flow of one cubic foot per second past a given point.

cross section. Shape and dimensions of a channel and valley perpendicular to the line of flow.

elev.-bridge deck. Elevation of a roadway across a bridge or culvert.

elev.-low chord. Elevation of lowest structural "beam" that limits the height of the bridge opening; or may indicate the top of a culvert opening.

elev.-low road. Elevation of low point on a roadway approaching or crossing a bridge or culvert - shown only if lower than elev.-bridge deck at a particular road section.

flood. An overflow of lands not normally covered by water; a temporary increase in streamflow or stage; or the discharge causing the overflow or temporary increase.

flood frequency. An expression of how often a flood of given magnitude can be expected.
Examples:
10-year frequency flood. The flood which can be expected or exceeded on an average once in 10 years; or which would have a 10 percent chance of being equaled or exceeded in any given year.
100-year frequency flood. ....one percent chance....in any given year.

flood peak or peak discharge. Highest discharge attained during a flood.

flood plain or flood-hazard area. Lands adjoining a stream (or other body of water) which has been or may be covered with water.

flood profile or profile. A plotted or imaginary line defining the highest water surface elevations along a stream during a particular flood.

flood-hazard area. See flood plain.

flood routing. Computation of the changes in the rise and fall in streamflow as a flood moves downstream. The results provide hydrographs of discharge versus time at given points on the stream.

floodway. The portion of the stream channel and flood plain that must be kept free of encroachment to prevent flood stages from rising more than 1 foot higher than natural conditions.

frequency-discharge curve. A plotted line showing the recurrence interval (or flood frequency) of discharges at a stream gage, surveyed cross section, or other station along stream. (Used with a stage-discharge curve to determine the high water elevations resulting from selected flood discharges at that station on the stream.)

hydrograph. A curve showing the rise and fall of flood discharge with respect to time at a specific station on the stream.

land use. Classification of type of vegetation or other surface cover conditions on a watershed - used (with a similar classification of soils) to indicate the rate and volume of flood runoff.

NGVD. National Geodetic Vertical Datum, the normal standard of elevation reference.

peak discharge or flood peak. The highest rate of runoff (discharge) attained during a flood.

profile. See flood profile.

runoff. That portion of the total storm rainfall flowing across the ground or other surface and contributing to the flood discharge.

stage-discharge curve. A plotted curve showing elevations resulting from a range of discharges at a surveyed cross section, stream gage, or other point on a stream.

top of culvert. Elevation of the uppermost flow surface of a culvert (or pipe) through which flood flows pass.

TBM. Temporary benchmark used for vertical reference.

watershed. A drainage area which collects and transmits runoff to the outlet of the drainage basin.

REFERENCES CITED

1. Topographic maps; 15 minute series; scale, 1:62500; U. S. Geological Survey, Washington, D. C.: Saxtons River, VT, 1957.

2. Water Resources Data for New Hampshire and Vermont, Water Year 1977, Report No. NH-VT-77-1, U. S. Geological Survey, Boston, MA; August 1978.

3. A Unified National Program for Flood Plain Management, U. S. Water Resources Council, Washington, D. C., September 1979.

4. Regulation of Flood Hazard Areas to Reduce Flood Losses, (two volumes), U. S. Water Resources Council, Washington, D. C., 1971 and 1972.

5. Flood Plain Management Handbook, U. S. Water Resources Council, Washington, D. C.; September 1981.

6. Guide for Flood and Flash Flood Preparedness Planning, U. S. Department of Commerce, National Weather Service, Silver Spring, MD, February 1977.

7. Flood Flow Frequency, Bulletin 17B, U. S. Water Resources Council, Washington, D. C., September 1981.

8. Computer Program for Project Formulation, Hydrology, Soil Conservation Service Technical Release No. 20, May 1965.

9. WSP2 Computer Program, Soil Conservation Service Technical Release No. 61, May 1976.

10. Floodway Determination Computer Program, Soil Conservation Service Technical Release No. 64, June 1978.

11. National Engineering Handbook, Section 4, Hydrology; U. S. Department of Agriculture, Soil Conservation Service; Washington, DC; November 1954, Revised August 1980.

USE OF APPENDIX

This appendix provides the data needed to use this report.

The Flood Plain Area Photomaps can be used for decisions where precise elevations are not required; for example, a brief check of the appropriate photomap may indicate that a proposed building site is obviously in or out of the flood plain.

On the reverse of each photomap are flood profiles, water surface elevation tabulations, and benchmark data. These can be used with the photomaps to determine flood elevations at any point along the streams in the study area as follows:

1. On the appropriate photomap find the point on the stream where the proposed building is to be located; then scale the distance along the stream to the nearest cross section.

2. On the appropriate flood profile sheet, scale the distance determined in Step 1 from the cross section back to the original stream location, and read the elevation of the desired flood frequency line.

3. Transfer the elevation determined in Step 2 to the ground from the nearest established benchmark.

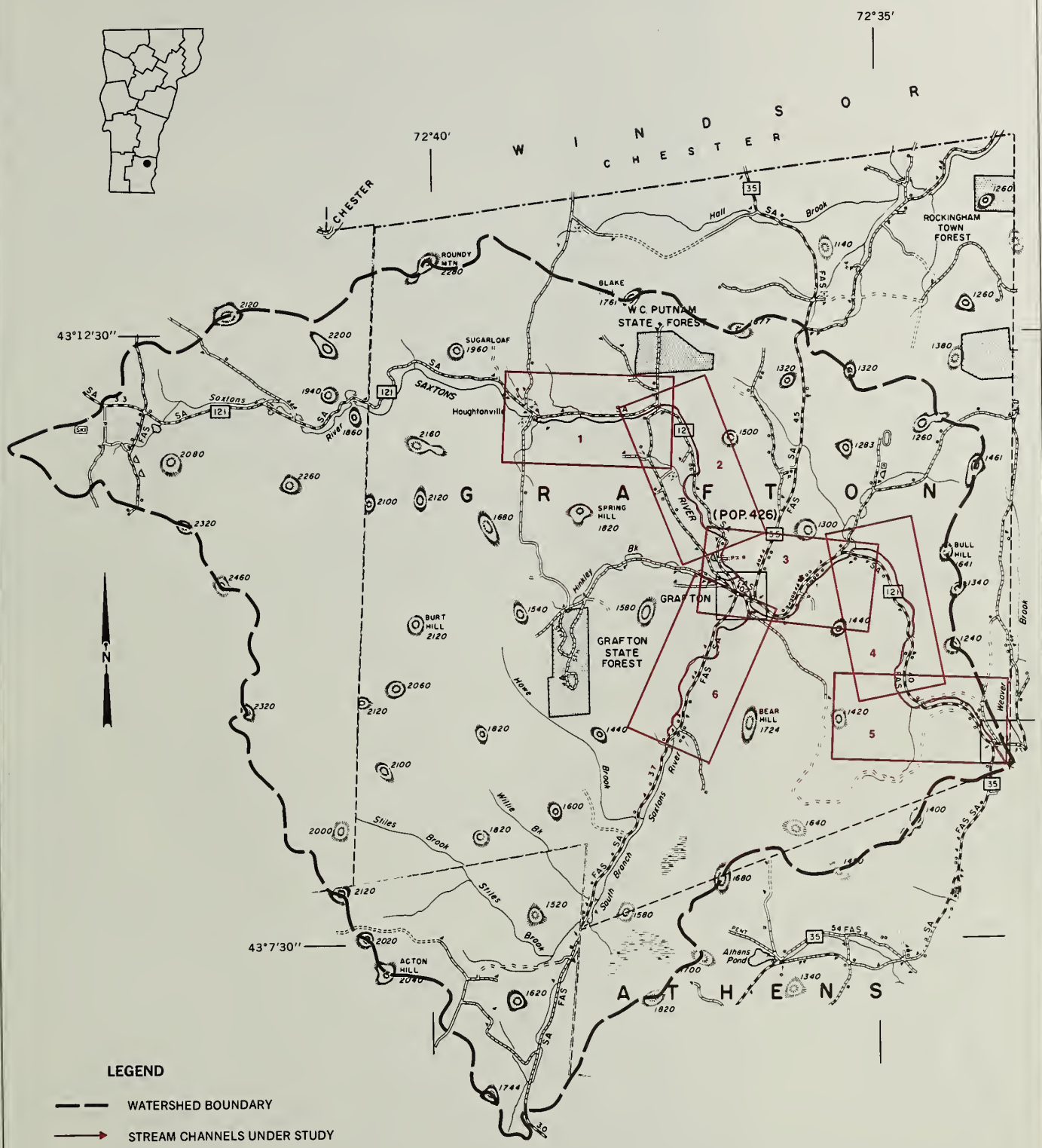
   If the point on the ground is at one of the surveyed cross sections, the elevation can be read directly from the tabulation of water surface elevations.

Investigations and analysis are described.

Steps that can be taken by individuals during a flood are described.

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE



LEGEND

- WATERSHED BOUNDARY
- STREAM CHANNELS UNDER STUDY
- 3 SHEET COVERAGE

SHEET INDEX MAP

FOR THE

GRAFTON FLOOD PLAIN MANAGEMENT STUDY

SAXTONS AND SOUTH BRANCH SAXTONS RIVERS
WINDHAM COUNTY, VT

SCALE 0 1 2 MILES
0 1 2 3 KILOMETERS
APPROXIMATE

Base Source prepared by Department of Highways,
Highway Planning Division, Windham County, VT

FEBRUARY 1985 4-R-39,070

USDA SCS-FORT WORTH, TEXAS 1985

SHEET 1 OF 6

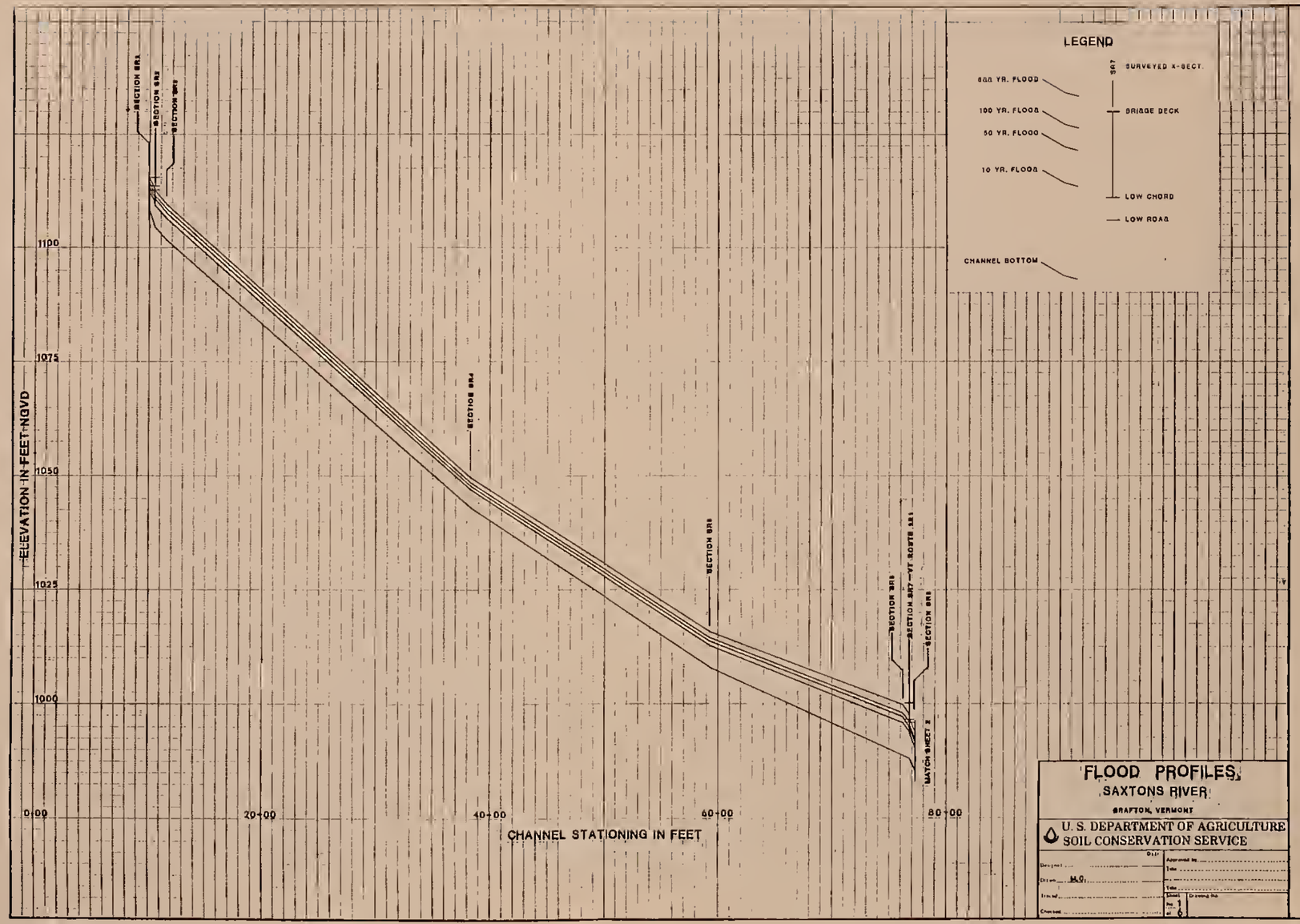
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
GRAFTON
FLOODPLAIN MANAGEMENT STUDY
WINDHAM COUNTY, VT.

FLOOD HAZARD AREA

SAXTONS RIVER

USDA SCS FORT WORTH TEXAS 1985

FEBRUARY 1985 # 396070



FLOOD PROFILES
SAXTONS RIVER
GRAFTON, VERMONT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Date:
Designed:
Drawn: M.O.
Traced:
Checked:
Approved by:
Title:
Title:
Title:
Sheet No. 1 of 2
Drawing No.

TABULATIONS OF WATER SURFACE ELEVATIONS

Location		Estimated elevation of floods with frequency of occurence of once in:	
Stream	Cross Section	100 years (National Geodetic Vertical Datum of 1929)	500 years
Saxtons River	SR1	1114.4	1115.8
	SR2	1112.0	1112.4
	SR3	1108.7	1109.5
	SR4	1048.6	1049.5
	SR5	1014.5	1015.4
	SR6	997.8	999.3
	SR7	995.8	997.1
	SR8	992.6	993.5

Tabulation of Elevation Marks for the Saxtons River

Number	Description and Elevation (NGVD)
RM21	Grafton, 2.4 miles west of; on Route 121, at bridge #38Ft-77 over, the Saxtons River, on the southwest abutment; a chiseled square. Elevation 1002.083
RM22	Houghtonville, 0.7 mile east of; on north side of Route 121, on power pole #19; a spike with flagging. Elevation 1042.968
RM23	Houghtonville, 0.5 mile east of; on north side of Route 121, on large stone headwall of culvert; a chiseled square Elevation 1054.178
RM24	Houghtonville, 0.2 mile east of; on south side of Route 121, 7 feet from south edge of road; top of orange pointed granite block, with orange steel pipe as marker. Elevation 1087.813
RM24A	Houghtonville, at east end of village; on Route 121, at bridge #BR35(7) over brook, on the southeast corner; a standard VT highway disk. Elevation 1109.513
RM25	Houghtonville, 140 feet south of Route 121 intersection on town highway, on southeast corner of small bridge over Saxtons River, on concrete wheel guard; a chiseled square. Elevation 1116.08

USERS GUIDE

The charts and tables contained on this sheet together with the photo base map on the reverse side, are intended to supply planners and landowners with the data necessary to plan the best use of the lands along the reach of stream depicted.

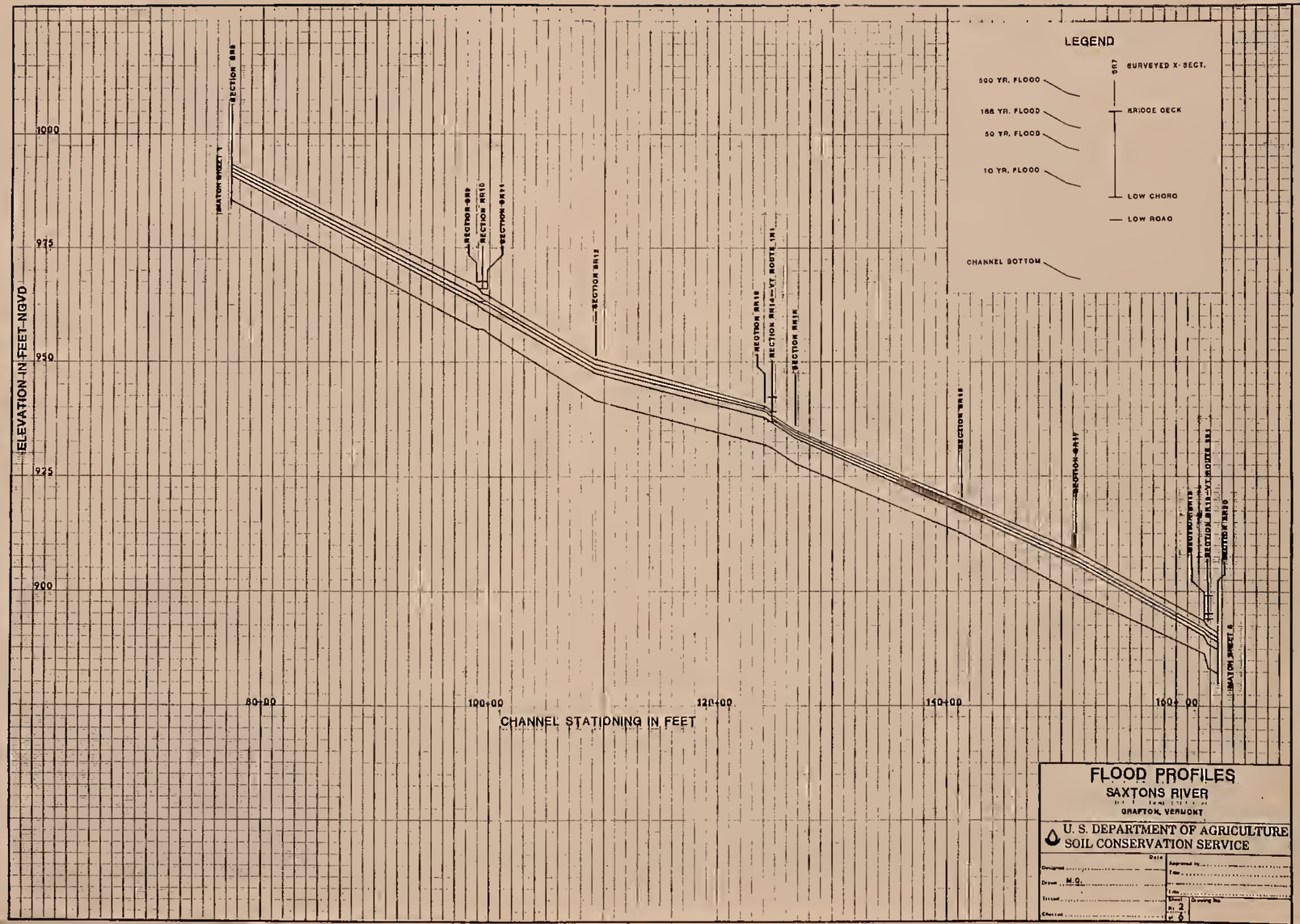
The photomap on the reverse side shows the 100 and 500-year flood boundaries along the stream reach. The location of U.S. Geological Survey Bench Marks and SCS temporary bench marks are also depicted to aid the user in establishing reference elevations.

The table of elevation reference marks on this side of the sheet gives a more detailed description of the bench mark locations together with a reference elevation in feet above mean sea level.

The tabulation of water surface elevations above lists the elevations of the 100-year and 500-year flood waters at the cross section locations which are depicted on the reverse side photomap. The 100-year storm is the reference storm used for setting actuary rates for flood insurance policies and the 500-year is generally considered the most extreme possible storm.

The channel and flood water profile above provides a more detailed picture of flood elevations along the reach of stream depicted on the photomap. It delineates the 10, 50, 100, and 500-year storm flood elevations along the entire reach and can be used to determine the water surface elevation that can be expected to occur at any specific point along the reach. This can be accomplished by locating the point of interest on the photomap, measuring the distance along the stream from a cross section, and then reading the desired flood water elevation from the profile at the same distance upstream or downstream of the cross section location.


MATCH TO SHEET
X RM 20
X RM 19
X RM 18
X RM 17
SR 9
SR 10
SR 11
SR 12
SR 13
SR 14
SR 15
SR 16
SR 17
SR 18
SR 19
SR 20
VERMONT RT 121
Saxtons River
SHEET 3
100 Year Flood Area
500 Year Flood Area
Surveyed Cross Section
Stream Channel
X RM 12 Bench Mark
Note Flood Boundaries shown may vary from actual ground location. See narrative for use of data
Spring 1974 Photography
500 0 500 FEET
100 0 100 200 METERS
APPROXIMATE SCALES
SHEET 2 OF 6
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
GRAFTON
FLOODPLAIN MANAGEMENT STUDY
WINDHAM COUNTY, VT.
FLOOD HAZARD AREA
SAXTONS RIVER
USDA SCS FORT WORTH TEXAS 1985
FEBRUARY 1985 # 3906



FLOOD PROFILES
SAXTONS RIVER
GRAFTON, VERMONT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Date
Designed
Drawn M.Q.
Traced
Checked
Approved by
Title
Date
Scale
Sheet No. 2 of 5
Drawing No.

TABULATIONS OF WATER SURFACE ELEVATIONS

Location		Estimated elevation of floods wich frequency of occurence of once in:	
Stream	Cross Section	100 years (National Geodatic Vertical Datum of 1929)	500 years
Saxtons River	SR8	992.6	993.5
	SR9	964.7	966.2
	SR10	963.6	964.8
	SR11	963.0	964.3
	SR12	949.4	950.3
	SR13	939.5	940.0
	SR14	938.3	938.8
	SR15	934.2	934.7
	SR16	918.8	919.7
	SR17	907.4	908.5
	SR18	892.0	893.6
	SR19	891.2	892.4
	SR20	890.1	891.3

Tabulation of Elevation Marks for the Saxtons River

Number	Description and Elevation (NGVD)
RM17	Grafton, 1.0 mile west of; at highway bridge #38FL-71 over the Saxtons River, on the southwest wing wall; a chiseled square . Elevation 898.783
RM18	Grafton, 1.6 miles west of; at highway bridge #ER35(6) over the Saxtons River, on the northeast corner; a VT highway disk. Elevation 941.298
RM19	Grafton, 1.9 miles west of; on Route 121 at the Grafton Village Apple Co. Sign on the south side of the road; a spike in the bottom of post. Elevation 964.428
RM20	Grafton, 2.2 miles west of; on northside of Route 121, at small private metal and wooden bridge over the Saxtons River, on the southeast corner; the top of bridge deck next to the metal post. Elevation 968.088
RM21	Grafton, 2.4 miles west of; on Route 121, at bridge #38FL-77 over the Saxtons River, on the southwest abutment; a chiseled square. Elevation 1002.083

USERS GUIDE

The charts and tables contained on this sheet together wich the photo base map on the reverse side, are intended to supply planners and landowners wich the data necessary to plan the best use of the lands along the reach of stream depicted.

The photomap on che reverse sida shows che 100 and 500-year flood boundarles along che stream reach. The location of U.S. Geological Survey Bench Marks and SCS temporary bench marks are also depicted to aid the user in estabilahing reference elevations.

The table of elevation reference marks on this alde of the sheet gives a more detailed desoription of the bench mark locations together with a reference elevation in feet above mean sea level.

The tabulation of water surface elevations above llsts the elevations of the 100-year and 500-year flood waters at the cross section locations which are depicted on the reverse side photomap. The 100-year storm is the reference storm used for setting actuary rates for flood insurance pollcles and cha 500-year la generally considered che most extreme possible storm.

The channel and flood water profile above provldes a more detailed picture of flood elevations along the reach of stream depicted on the photomap. It delineates che 10, 50, 100, and 500-year storm flood elevations along the entire reach and can be used to determine the water surface elevation that can be expected to occur at any specific point along the reach. This can be accomplished by locating the point of interest on the photomap, measuring the distance along the stream from a cross section, and then reading the desired flood water elevation from the profile at the same distance upstream or downstream of the cross section location.

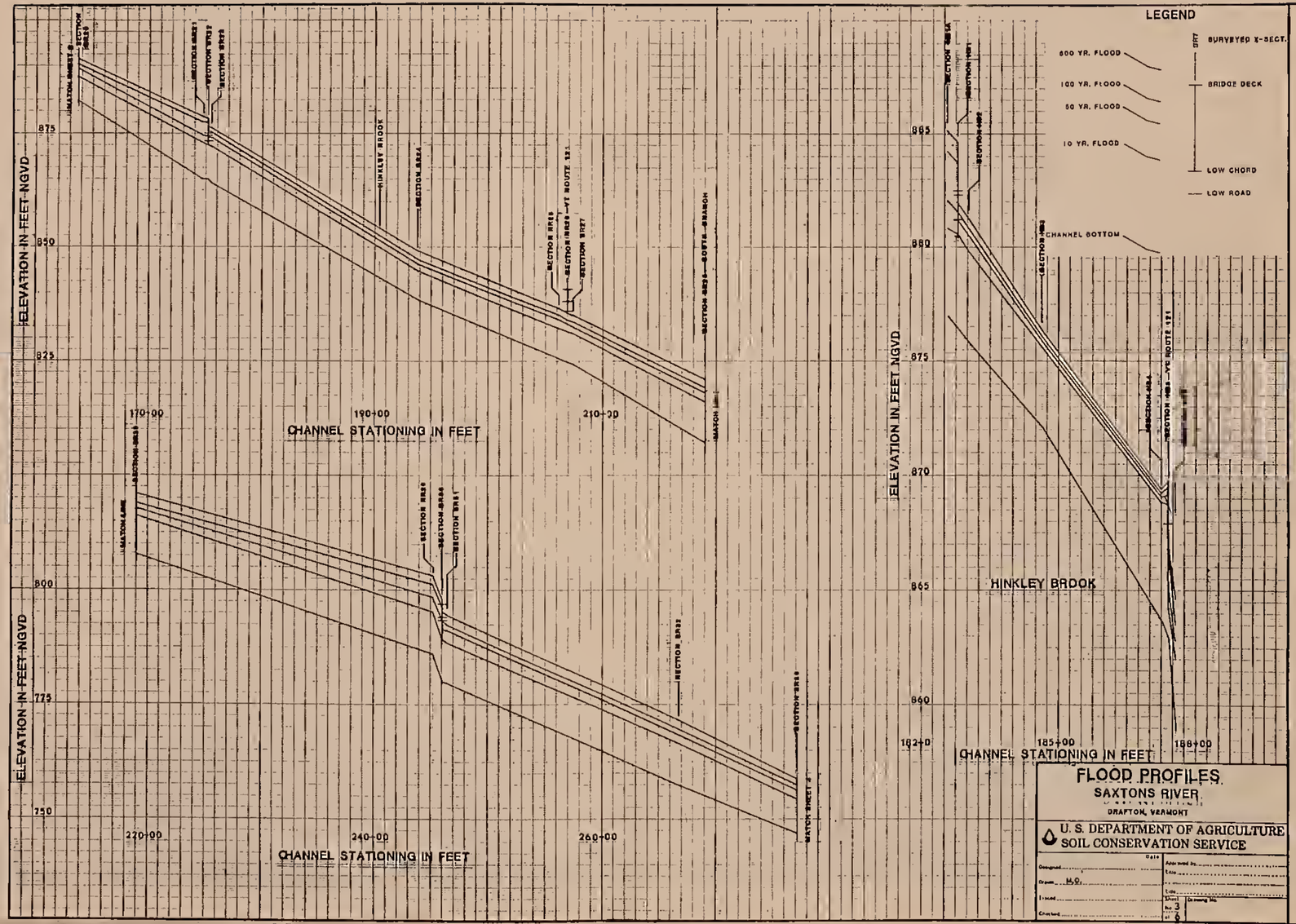
SHEET 3 OF 6

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
GRAFTON
FLOODPLAIN MANAGEMENT STUDY
WINDHAM COUNTY, VT.

FLOOD HAZARD AREA

SAXTONS RIVER

USDA SCS FORT WORTH, TEXAS 1985
FEBRUARY 1985 J R 39070



FLOOD PROFILES
SAXTONS RIVER
DRAFTON, VERMONT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed — Date
Drawn M.D.
Traced
Checked
Approved by
Date
Date
Sheet No. 3
Drawing No.

TABULATIONS OF WATER SURFACE ELEVATIONS

Location		Estimated elevation of floods with frequency of occurence of once in:	
		100 years	500 years
Stream	Cross Section	(National Geodetic Vertical Datum of 1929)	
Saxtons River	SR20	880.1	881.7
	SR21	877.3	878.5
	SR22	877.3	878.5
	SR23	875.2	876.5
	SR24	847.5	849.1
	SR25	835.7	836.9
	SR26	834.5	835.7
	SR27	833.9	835.1
	SR28	818.9	820.8
	SR29	796.1	798.0
	SR30	796.0	798.0
	SR31	792.7	794.8
	SR32	769.9	771.7
	SR33	757.5	759.0
Hinkley Brook	HB1A	884.2	885.1
	HB1	883.6	884.5
	HB2	880.8	881.2
	HB3	878.0	876.7
	HB4	869.1	869.2
	HB5	869.4	865.7
	HB6	863.8	864.6

Tabulation of Elevation Marks for the Saxtons River

Number	Description and Elevation (NGVD)
RM10	Grafton, 3.4 miles east of; at highway bridge 150126(1) SA1972 over Saxtons River; on southeast corner; a VT standard disk. Elevation 759.01
RM11	Grafton, 1.3 miles east of; on northside of road; top of large concrete post marked VT-1977-S-0126-1-SA. Elevation 767.742
RM12	Grafton, 3.0 mile east of; at town garage on north side of Route 121, on concrete slab at bottom of center column, at front of building; a chiseled square. Elevation 743.097
RM13	Grafton, 0.75 mile east of; on north side of Route 121, at small concrete bridge over Saxtons River, on northeast corner; a chiseled square. Elevation 739.947
RM14	Grafton, 0.4 mile east of; on north side of road on power pole #38/29/19 across from "Grafton Hardware Products"; spike in pole. Elevation 871.952
RM2	Grafton, at southwest corner of village; on highway bridge 138(7)0 1934, at northeast corner; a standard USGS disk marked "BI 1928 Reset 1947". Elevation 841.488
RM15	Grafton, at church on west side of village; near front door, next to hand railing post; the top of the bottom concrete step. Elevation 877.828
RM1A	Grafton, 0.7 mile north of RM2; on north side of Route 121, a private bridge over Saxtons River; 100 feet west of mile marker 13(2)6/1336/0500, on the southeast corner; a chiseled square. Elevation 879.249

REPORT NARRATIVE

The charts and tables contained on this sheet together with the photo base map on the reverse side, are intended to supply planners and landowners with the data necessary to plan the best use of the lands along the reach of stream depicted.

The photomap on the reverse side shows the 100 and 500-year flood boundaries along the stream reach. The location of U.S. Geological Survey Bench Marks and SCS temporary bench marks are also depicted to aid the user in establishing reference elevations.

The table of elevation reference marks on this side of the sheet gives a more detailed description of the bench mark locations together with a reference elevation in feet above mean sea level.

The tabulation of water surface elevations above lists the elevations of the 100-year and 500-year flood waters at the cross section locations which are depicted on the reverse side photomap. The 100-year storm is the reference storm used for setting actuary rates for flood insurance policies and the 500-year is generally considered the most extreme possible storm.

The channel and flood water profile shows provides a more detailed picture of flood elevations along the reach of stream depicted on the photomap. It delineates the 10, 50, 100, and 500-year storm flood elevations along the entire reach and can be used to determine the water surface elevation that can be expected to occur at any specific point along the reach. This can be accomplished by locating the point of interest on the photomap, measuring the distance along the stream from a cross section, and then reading the desired flood water elevation from the profile at the same distance upstream or downstream of the cross section location.

USDA SCS FORT WORTH, TEXAS 1985

100 Year Flood Area

500 Year Flood Area

Surveyed Cross Section

Stream Channel

X RM 12 Bench Mark

Note: Flood Boundaries shown may vary from actual ground location. See narrative for use of data

Spring 1974 Photography

500 0 500 FEET

100 0 100 200 METERS

APPROXIMATE SCALES

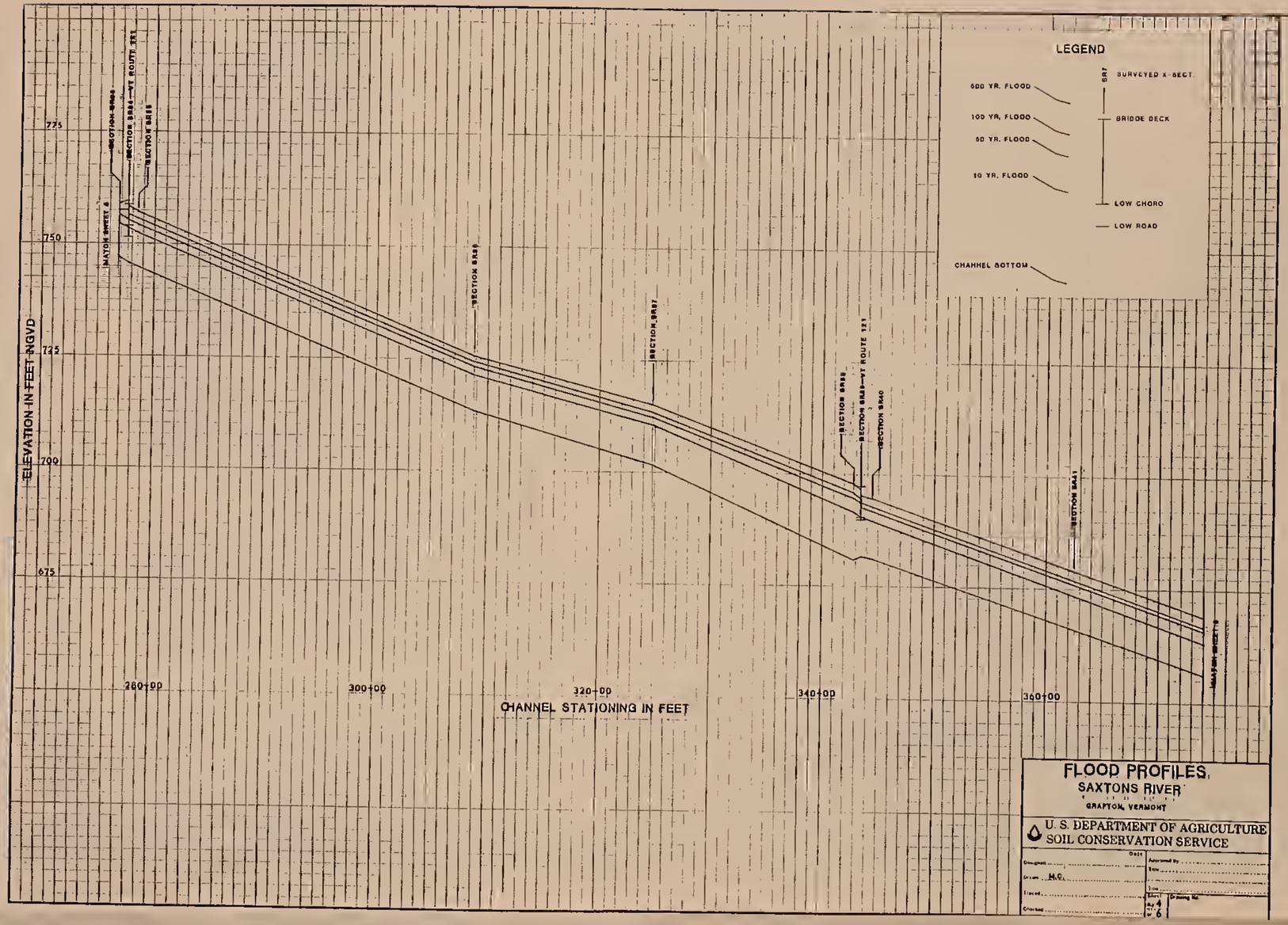
SHEET 4 OF 6

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
GRAFTON
FLOODPLAIN MANAGEMENT STUDY
WINDHAM COUNTY, VT.

FLOOD HAZARD AREA

SAXTONS RIVER

FEBRUARY 1985 R 39070



FLOOD PROFILES
SAXTONS RIVER
GRAFTON, VERMONT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Date
Designed
Drawn H.O.
Traced
Checked
Approved by
Title
Title
Sheet No. of 4 sheets
Drawing No.

TABULATIONS OF WATER SURFACE ELEVATIONS

Stream	Location: Cross Section	Estimated elevation of floods with frequency of occurence of once in: 100 years (National Geodetic Vertical Datum of 1929)	500 years (National Geodetic Vertical Datum of 1929)
Saxtons River	SR33	757.5	759.0
	SR34	757.4	759.6
	SR35	755.4	757.1
	SR36	724.3	725.8
	SR37	713.1	715.0
	SR38	695.8	697.8
	SR39	694.7	696.8
	SR40	692.5	694.2
	SR41	676.6	678.7

Tabulation of Elevation Marks for the Saxtons River

Number	Description and Elevation (NGVD)
RM5	Cambridgeport, 1.1 miles west of; at power pole #411 on south side of Route 121; a spike in pole with flagging. Elevation 686.007
RM6	Cambridgeport, 1.5 miles west of; at highway bridge #BRS0125(25); a standard highway disk on northeast corner. Elevation 695.962
TBM1	Grafton, 2.2 miles east of; on northside of Route 121 across from "Hidden Drive" sign, 50 feet west of power pole #387/75, on west side of guardrails; a nail with flagging in post. Elevation 727.222
RM8	Grafton, 1.8 miles east of; on north side of road, 30 feet west of "Speed Zone Ahead" traffic sign, at power pole #373/63; spike in pole. Elevation 729.162
RM9	Grafton, 1.6 miles east of; on north side of road, east side of large barn; top of metal well cap. Elevation 743.922

USERS GUIDE

The charts and tables contained on this sheet together with the photo base map on the reverse side, are intended to supply planners and landowners with the data necessary to plan the best use of the lands along the reach of stream depicted.

The photomap on the reverse side shows the 100 and 500-year flood boundaries along the stream reach. The location of U.S. Geological Survey Bench Marks and SCS temporary bench marks are also depicted to aid the user in establishing reference elevations.

The table of elevation reference marks on this side of the sheet gives a more detailed description of the bench mark locations together with a reference elevation in feet above mean sea level.

The tabulation of water surface elevations above lists the elevations of the 100-year and 500-year flood waters at the cross section locations which are depicted on the reverse side photomap. The 100-year storm is the reference storm used for setting actuary rates for flood insurance policies and the 500-year is generally considered the most extreme possible storm.

The channel and flood water profile above provides a more detailed picture of flood elevations along the reach of stream depicted on the photomap. It delineates the 10, 50, 100, and 500-year storm flood elevations along the entire reach and can be used to determine the water surface elevation that can be expected to occur at any specific point along the reach. This can be accomplished by locating the point of interest on the photomap, measuring the distance along the stream from a cross section, and then reading the desired flood water elevation from the profile at the same distance upstream or downstream of the cross section location.

SHEET 5 OF 6

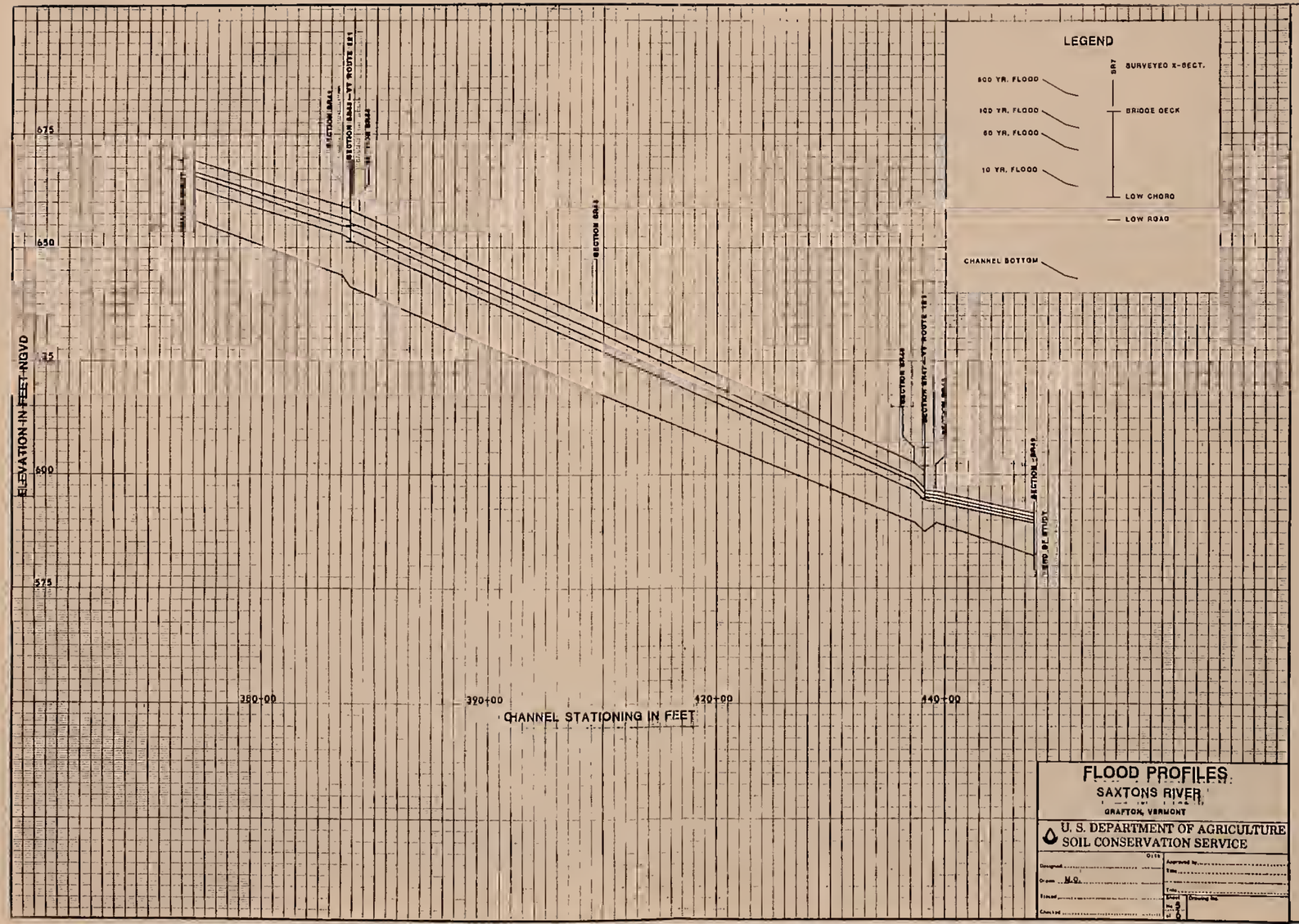
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GRAFTON
FLOODPLAIN MANAGEMENT STUDY
WINDHAM COUNTY, VT.

FLOOD HAZARD AREA

SAXTONS RIVER

USDA SCS-FORT WORTH, TEXAS 1985
FEBRUARY 1985 P 3960



FLOOD PROFILES
SAXTONS RIVER
GRAFTON, VERMONT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Date
Designed
Drawn N.O.
Traced
Checked
Approved by
Title
Date
Sheet No. 3 of 3 Sheets
Drawing No.

TABULATIONS OF WATER SURFACE ELEVATIONS

Location		Estimated elevation of floods with frequency of occurence of once in:	
Stream	Cross Section	100 years (National Geodetic Vertical Datum of 1929)	500 years
Saxtons River	SR42	656.3	659.0
	SR43	655.9	658.7
	SR44	654.5	657.1
	SR45	631.4	634.1
	SR46	599.7	602.8
	SR47	597.1	600.7
	SR48	595.4	596.1
	SR49	590.4	591.1

Tabulation of Elevation Marks for the Saxtons River

Number	Description and Elevation (NGVD)
BM1	Cambridgeport, 400 feet west of concrete and steel bridge over the Saxtons River, at the east end of an auto pulloff, on the top of an embedded boulder; a standard USGS disk stamped "R 3 1928 605" and painted gold. Elevation 604.617
RM1	Cambridgeport, at highway bridge over Saxtons River; at west end of village, 400 feet east of BM R3, on northwest wing wall; a chiseled square. Elevation 605.207
RM2	Cambridgeport, 0.2 miles west of BM1 on Route 121; on power pole #3/44, 50 feet east of Walton mailbox; a spike with flagging. Elevation 621.272
RM3	Cambridgeport, 0.4 mile west of; at power pole # 434/127 on north side of road, 45 feet east of mile marker #0125/1306/0340; spike in pole. Elevation 644.302
RM4	Cambridgeport, 0.75 mile west of; at bridge over Saxtons River; Bridge #PSO 1568 1937; 50 feet south of mile marker 0125/1306/0390; on northeast abutment; a chiseled square. Elevation 658.452

USERS GUIDE

The charts and tables contained on this sheet together with the photo base map on the reverse side, are intended to supply planners and landowners with the data necessary to plan the best use of the lands along the reach of stream depicted.

The photomap on the reverse side shows the 100 and 500-year flood boundaries along the stream reach. The location of U.S. Geological Survey Bench Marks and SCS temporary bench marks are also depicted to aid the user in establishing reference elevations.

The table of elevation reference marks on this side of the sheet gives a more detailed description of the bench mark locations together with a reference elevation in feet above mean sea level.

The tabulation of water surface elevations above lists the elevations of the 100-year and 500-year flood waters at the cross section locations which are depicted on the reverse side photomap. The 100-year storm is the reference storm used for setting actuary rates for flood insurance policies and the 500-year is generally considered the most extreme possible storm.

The channel and flood water profile above provides a more detailed picture of flood elevations along the reach of stream depicted on the photomap. It delineates the 10, 50, 100, and 500-year storm flood elevations along the entire reach and can be used to determine the water surface elevation that can be expected to occur at any specific point along the reach. This can be accomplished by locating the point of interest on the photomap, measuring the distance along the stream from a cross section, and then reading the desired flood water elevation from the profile at the same distance upstream or downstream of the cross section location.

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
GRAFTON
FLOODPLAIN MANAGEMENT STUDY
WINDHAM COUNTY, VT.

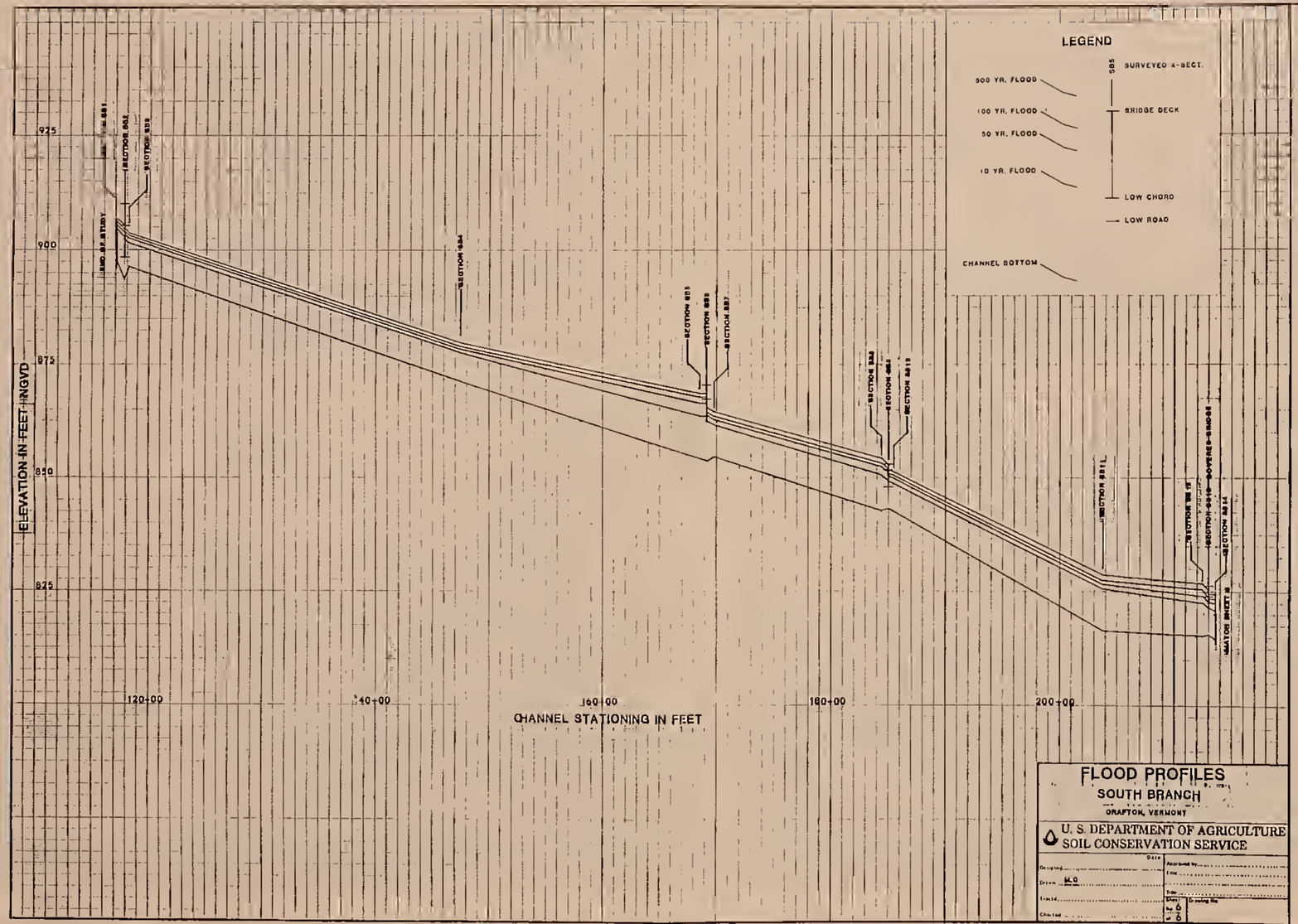
SHEET 6 OF 6

FLOOD HAZARD AREA

SOUTH BRANCH SAXTONS RIVER

USDA SCS FORT WORTH TEXAS 1985

FEBRUARY 1985 1" = 200'



FLOOD PROFILES
SOUTH BRANCH
GRAFTON, VERMONT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Date
Designed
Drawn MLO
Traced
Checked
Approved by
Title
Sheet No. 2 of 2
Drawing No.

TABULATIONS OF WATER SURFACE ELEVATIONS

Location		Estimated elevation of floods with frequency of occurence of once in	
		100 years	500 years
Stream	Cross Section	(National Geodetic Vertical Datum of 1929)	
South Branch	SB1	906.0	906.5
	SB2	904.1	905.1
	SB3	903.0	903.7
	SB4	879.0	879.9
	SB5	867.8	868.5
	SB6	867.8	868.5
	SB7	863.5	864.3
	SB8	852.9	853.9
	SB9	851.7	852.5
	SB10	850.2	851.0
	SB11	827.3	828.7
	SB12	825.1	826.7
	SB13	823.9	825.1
	SB14	823.1	824.3

Tabulation of Elevation Marks for the South Branch of the Saxtons River

Number	Description and Elevation (NGVD)
BM1	Grafton, 0.2 mile south of; on east side of road just the "Old Tavern", on the second fire hydrant in front of white house; the bolt nearest the letter "F" in the word "Fittings." Elevation 859.613
BM2	Grafton, 0.4 mile south of; on east side of road, on hydrant next to barn entrance; the bolt nearest the letter "F" in the word "Fittings." Elevation 856.293
BM3	Grafton, 0.65 mile south of; 50 feet north of "Village Cheese Co." on east side of road; a bolt on the fire hydrant nearest the letter "F". Elevation 851.893
BM4	Grafton, 0.9 mile south of; on concrete bridge over the South Branch of the Saxtons River, on the southeast corner of wing wall; a chiseled square. Elevation 870.171
BM5	Grafton, 1.4 miles south of; on east side of road; a spike in power pole 1342/10/19. Elevation 890.948
BM6	Grafton, 1.85 miles south of; at highway bridge BFL38-69 over the South Branch of the Saxtons River, on the northeast corner; a chiseled square. Elevation 909.603
BM7	Grafton, 1.7 miles south of; 0.1 mile north of BM6, on east side of road, on center of large concrete headwall; a chiseled square. Elevation 900.418

USERS GUIDE

The charts and tables contained on this sheet together with the photo base map on the reverse side, are intended to supply planners and landowners with the data necessary to plan the best use of the lands along the reach of stream depicted.

The photomap on the reverse side shows the 100 and 500-year flood boundaries along the stream reach. The location of U.S. Geological Survey Bench Marks and SCS temporary bench marks are also depicted to aid the user in establishing reference elevations.

The table of elevation reference marks on this side of the sheet gives a more detailed description of the bench mark locations together with a reference elevation in feet above mean sea level.

The tabulation of water surface elevations above lists the elevations of the 100-year and 500-year flood waters at the cross section locations which are depicted on the reverse side photomap. The 100-year storm is the reference storm used for setting actuary rates for flood insurance policies and the 500-year is generally considered the most extreme possible storm.

The channel and flood water profile above provides a more detailed picture of flood elevations along the reach of stream depicted on the photomap. It delineates the 10, 50, 100, and 500-year storm flood elevations along the entire reach and can be used to determine the water surface elevation that can be expected to occur at any specific point along the reach. This can be accomplished by locating the point of interest on the photomap, measuring the distance along the stream from a cross section, and then reading the desired flood water elevation from the profile at the same distance upstream or downstream of the cross section location.

TABULATIONS OF WATER SURFACE ELEVATIONS

Location		Estimated elevation of floods with frequency of occurrence of once in:			
Stream	Cross Section	10 years	50 years	100 years	500 years
		(National Geodetic Vertical Datum of 1929)			
Saxtons River	SR1	1112.6	1113.7	1114.4	1115.8
	SR2	1110.3	1111.5	1112.0	1112.4
	SR3	1106.6	1108.0	1108.7	1109.5
	SR4	1047.0	1047.9	1048.6	1049.5
	SR5	1012.9	1013.9	1014.5	1015.4
	SR6	995.4	996.9	997.8	999.3
	SR7	993.6	994.8	995.8	997.1
	SR8	991.0	992.0	992.6	993.5
	SR9	962.4	963.8	964.7	966.2
	SR10	961.5	962.8	963.6	964.8
	SR11	960.8	962.2	963.0	964.3
	SR12	947.3	948.6	949.4	950.3
	SR13	937.8	939.0	939.5	940.0
	SR14	936.4	937.9	938.3	938.8
	SR15	933.2	933.9	934.2	934.7
	SR16	917.1	918.0	918.8	919.7
	SR17	905.7	906.8	907.4	908.5
	SR18	890.1	891.2	892.0	893.6
	SR19	888.9	890.3	891.2	892.4
	SR20	887.7	889.1	890.1	891.3
	SR21	872.9	874.8	877.3	878.5
	SR22	872.5	874.4	877.3	878.5
	SR23	872.2	874.1	875.2	876.5
	SR24	845.2	846.6	847.5	849.1
	SR25	832.6	834.3	835.3	836.9
	SR26	832.0	833.5	834.5	835.7
	SR27	831.4	832.8	833.9	835.1
	SR28	815.9	817.7	818.9	820.8
	SR29	790.5	793.4	796.1	798.0
	SR30	789.8	792.9	796.0	798.0

TABULATIONS OF WATER SURFACE ELEVATIONS

Location		Estimated elevation of floods with frequency of occurrence of once in:			
Stream	Cross Section	10 years	50 years	100 years	500 years
		(National Geodetic Vertical Datum of 1929)			
Saxtons River	SR31	788.8	791.1	792.7	794.8
(cont'd)	SR32	766.5	768.5	769.9	771.7
	SR33	754.4	756.5	757.5	759.0
	SR34	753.3	755.1	757.4	759.6
	SR35	752.4	754.2	755.4	757.1
	SR36	721.5	723.3	724.3	725.8
	SR37	710.4	712.0	713.1	715.0
	SR38	691.5	694.4	695.8	697.8
	SR39	690.2	693.3	694.7	696.8
	SR40	689.4	691.5	692.5	694.2
	SR41	673.2	675.3	676.6	678.7
	SR42	652.5	654.7	656.3	659.0
	SR43	651.9	654.3	655.9	658.7
	SR44	650.7	653.0	654.5	657.1
	SR45	627.4	629.7	631.4	634.1
	SR46	596.5	598.3	599.7	602.8
	SR47	594.3	595.7	597.1	600.7
	SR48	594.1	594.8	595.4	596.1
	SR49	589.3	590.0	590.4	591.1
South Branch	SB1	904.6	905.5	906.0	906.5
	SB2	902.7	903.5	904.1	905.1
	SB3	901.7	902.5	903.0	903.7
	SB4	877.4	878.4	879.0	879.9
	SB5	863.4	866.3	867.8	868.5
	SB6	863.4	866.3	867.8	868.5
	SB7	861.8	862.8	863.5	864.3
	SB8	850.2	852.2	852.9	853.9

TABULATIONS OF WATER SURFACE ELEVATIONS

Location		Estimated elevation of floods with frequency of occurrence of once in:			
Stream	Cross Section	10 years	50 years	100 years	500 years
		(National Geodetic Vertical Datum of 1929)			
South Branch	SB9	849.4	851.2	851.7	852.5
(cont'd)	SB10	848.8	849.7	850.2	851.0
	SB11	825.4	826.5	827.3	828.7
	SB12	822.2	823.9	825.1	826.7
	SB13	821.4	822.9	823.9	825.1
	SB14	820.9	822.3	823.1	824.3
Hinkley Brook	HB1A	880.8	882.1	884.2	885.1
	HB1	880.5	881.5	883.6	884.5
	HB2	879.8	880.5	880.8	881.2
	HB3	875.6	875.8	876.0	876.3
	HB4	868.7	868.9	869.1	869.2
	HB5	868.7	869.1	869.4	869.7
	HB6	862.1	862.9	863.6	864.6

Tabulation of Elevation Reference Marks for the Saxtons River

Number	Description and Elevation (NGVD)
BM1	Cambridgeport, 400 feet west of concrete and steel bridge over the Saxtons River, at the east end of an auto pulloff, on the top of an embedded boulder; a standard USGS disk stamped "R 3 1928 605" and painted gold. Elevation 604.617
RM1	Cambridgeport, at highway bridge over Saxtons River; at west end of village, 400 feet east of BM R3, on northwest wing wall; a chiseled square. Elevation 605.207
RM2	Cambridgeport, 0.2 miles west of BM1 on Route 121; on power pole #3/44, 50 feet east of Walton mailbox; a spike with flagging. Elevation 621.272
RM3	Cambridgeport, 0.4 mile west of; at power pole # 434/127 on north side of road, 45 feet east of mile marker #0125/1306/0340; spike in pole. Elevation 644.302
RM4	Cambridgeport, 0.75 mile west of; at bridge over Saxtons River; Bridge #PSO 156B 1937; 50 feet south of mile marker 0125/1306/0300; on northeast abutment; a chiseled square. Elevation 658.452
RM5	Cambridgeport, 1.1 miles west of; at power pole #411 on south side of Route 121; a spike in pole with flagging. Elevation 686.007
RM6	Cambridgeport, 1.5 miles west of; at highway bridge #BHS0125(25); a standard highway disk on northeast corner. Elevation 695.962
TBM1	Grafton, 2.2 miles east of; on northside of Route 121 across from "Hidden Drive" sign, 50 feet west of power pole #387/75, on west side of guardrails; a nail with flagging in post. Elevation 727.222
RM8	Grafton, 1.8 miles east of; on north side of road, 30 feet west of "Speed Zone Ahead" traffic sign, at power pole #373/63; spike in pole. Elevation 729.162
RM9	Grafton, 1.6 miles east of; on north side of road, east side of large barn; top of metal well cap. Elevation 743.922

Tabulation of Elevation Reference Marks for the Saxtons River

Number	Description and Elevation (NGVD)
RM10	Grafton, 1.4 miles east of; at highway bridge #50126(1) SA1972 over Saxtons River, on southwest corner; a VT standard disk. Elevation 759.01
RM11	Grafton, 1.3 miles east of; on northside of road; top of large concrete post marked VT-1972-S-0126-1-SA. Elevation 767.742
RM12	Grafton, 1.0 mile east of; at town garage on north side of Route 121, on concrete slab at bottom of center column, at front of building; a chiseled square. Elevation 783.087
RM13	Grafton, 0.75 mile east of; on north side of Route 121, at small concrete bridge over Saxtons River, on northeast corner; a chiseled square. Elevation 798.947
RM14	Grafton, 0.4 mile east of; on north side of road on power pole #34/29/19 across from "Grafton Hardwood Products"; spike in pole. Elevation 823.902
BM2	Grafton, at southwest corner of village; on highway bridge #38FL70 1939, at northeast corner; a standard USGS disk marked "R4 1928 Reset 1941". Elevation 841.468
RM15	Grafton, at church on west side of village; near front door, next to hand railing post; the top of the bottom concrete step. Elevation 877.828
RM16	Grafton, 0.7 mile north of BM2; on north side of Route 121, a highway bridge over Saxtons River; 100 feet west of mile marker #0126/1306/0500, on the southeast corner; a chiseled square. Elevation 873.298
RM17	Grafton, 1.0 mile west of; at highway bridge #38FL-71 over the Saxtons River, on the southwest wing wall; a chiseled square . Elevation 898.783
RM18	Grafton, 1.6 miles west of; at highway bridge #ER35(6) over the Saxtons River, on the northeast corner; a VT highway disk. Elevation 941.298

Tabulation of Elevation Reference Marks for the Saxtons River

Number	Description and Elevation (NGVD)
RM19	Grafton, 1.9 miles west of; on Route 121 at the Grafton Village Apple Co. Sign on the south side of the road; a spike in the bottom of post. Elevation 964.428
RM20	Grafton, 2.2 miles west of; on northside of Route 121, at small private metal and wooden bridge over the Saxtons River, on the southeast corner; the top of bridge deck next to the metal post. Elevation 968.088
RM21	Grafton, 2.4 miles west of; on Route 121, at bridge #38FL-77 over the Saxtons River, on the southwest abutment; a chiseled square. Elevation 1002.083
RM22	Houghtonville, 0.7 mile east of; on north side of Route 121, on power pole #19; a spike with flagging. Elevation 1042.968
RM23	Houghtonville, 0.5 mile east of; on north side of Route 121, on large stone headwall of culvert; a chiseled square Elevation 1054.178
RM24	Houghtonville, 0.2 mile east of; on south side of Route 121, 7 feet from south edge of road; top of orange pointed granite block, with orange steel pipe as marker. Elevation 1087.813
RM24A	Houghtonville, at east end of village; on Route 121, at bridge #ER35(7) over brook, on the southeast corner; a standard VT highway disk. Elevation 1109.513
RM25	Houghtonville, 140 feet south of Route 121 intersection on town highway, on southeast corner of small bridge over Saxtons River, on concrete wheel guard; a chiseled square. Elevation 1116.08

Tabulation of Elevation Reference Marks for the South Branch of the Saxtons River

Number	Description and Elevation (NGVD)
RM1	Grafton, 0.2 mile south of; on east side of road past the "Old Tavern", on the second fire hydrant in front of white house; the bolt nearest the letter 'F' in the word "Fittings." Elevation 859.613
RM2	Grafton, 0.4 mile south of; on east side of road, on hydrant next to barn entrance; the bolt nearest the letter 'F' in the word "Fittings." Elevation 856.293
RM3	Grafton, 0.65 mile south of; 50 feet north of "Village Cheese Co." on east side of road; a bolt on the fire hydrant nearest the letter 'F'. Elevation 853.893
RM4	Grafton, 0.9 mile south of; on concrete bridge over the South Branch of the Saxtons River, on the southeast corner of wing wall; a chiseled square. Elevation 870.373
RM5	Grafton, 1.4 miles south of; on east side of road; a spike in power pole #342/30/19. Elevation 890.948
RM6	Grafton, 1.85 miles south of; at highway bridge #FL38-69 over the South Branch of the Saxtons River, on the northeast corner; a chiseled square. Elevation 909.603
RM7	Grafton, 1.7 miles south of; 0.1 mile north of RM6, on east side of road, on center of large concrete headwall; a chiseled square. Elevation 900.418

Investigations and Analysis

Approximately 10 miles of differential levels to establish vertical control and 68 cross sections were surveyed for this study. Surveys are referenced to National Geodetic Vertical Datum (NGVD) of 1929. Reference mark Descriptions and Elevations are listed in preceding tables and located on appropriate photomaps.

Flood runoff volumes and flow rates were developed using the SCS computer model described in Technical Release No. 20 (Reference No. 8). Flow-frequency values from this hydrologic model were adjusted as necessary in analyzing them along with values from similar gaged watersheds. Flood plain geometry and hydraulic characteristics were acquired by field surveys along the river systems. Flood-frequency surfaces were computed using the adjusted flows from the hydrologic model as inputs to water surface profile development, using the Soil Conservation Service's Technical Release No. 61 (Reference No.9). Results were checked against known high water marks at selected locations. The products of these analysis are the basis for much of the boundary elevation and profile information contained in this report. This report's information reflects coordination with evaluations made by others.

The flood stages provided for selected storm frequencies should be considered as minimum elevations for the prescribed uses of this report. Certain indeterminate factors and conditions affecting future flood flows could cause higher flood stages than indicated. These include ice and debris, clogging of bridges and culverts, sediment, ice and debris jams along the channel and flood plain, and changes in the vegetative character of the channels and flood plain.

Analysis of the hydraulic characteristics of streams were carried out using the SCS computer program WSP-2 (Ref. 9). Cross section data for the streams and structural geometry of bridges and culverts were obtained by transit surveys. From stage-discharge curves, elevations and flood boundaries could be determined at the cross sections. Straight line interpolations of the elevations were used for flood profiles between cross sections. Flood boundaries between cross sections were drawn on the photomaps using USGS topographic maps and aerial photos as a guide. The results were reviewed with state and town officials to eliminate any obvious errors.

The photomaps were assembled as strips from spring 1974, 1:5000 scale, Vermont Mapping Program, Orthophoto Maps by the USDA-SCS Fort Worth, Texas Cartographic Unit.

Steps That Can Be Taken By Individuals During a Flood

This flood plain management study is an aid to persons living in flood prone areas. If your home is within the flood plain, the following information should serve as a guide for dealing with floods.

Being well informed is your best protection. It is extremely important to know where to go in the event of a flood. Remember that roads are often built in valleys where floodwaters will most likely go. You should reach higher ground, and it my be easier and safer to do this on foot, rather than by car.

The major causes of floods are melting snows and rainfall. Listen to the weather reports and be aware of the chance of flooding. Never ignore a flood warning. Listen for emergency instructions and follow instructions given.

If it is necessary for you to evacuate your home, do so quickly and cautiously. Follow evacuation instructions that are given. Do not try to take all of your belongings with you. Take necessary personal items such as eyeglasses or medicines, flashlights, a small supply of canned food, a can opener and several blankets.

If you are traveling by car you may encounter these hazards:

washed-out roads or bridges
undermined roadway
landslides
fallen rocks
downed powerlines
floating debris

Watch out for these hazards carefully.

If it is not necessary to evacuate your home, there are precautions you should proceed with.

Fill large containers with water and after doing so shut off the main water valve to protect the clean water already in your water system. Be certain to shut off your water heater since no water will be going to it.

As long as electric service is available it may be used safely unless the main circuits are flooded. In such a case you will reduce the risk of electrical shock and short circuits if you turn the power off. Do not touch the switch if you are wet or standing in water. Unless you detect a gas leak, you may continue to use gas systems.

Be aware that floods often produce fire hazards. Watch for broken or leaking gas or oil lines, flooded electrical circuits, flooded furnaces and other appliances, and inflammable or explosive materials which may come from upstream.

Anchor or move inside any belongings such as trash cans, toys, lawnmowers, etc. They may become hazards to people downstream if they are washed away.

Move livestock to high, open ground and if possible keep them from drinking flood water or eating feed soaked with flood water.

The following items could help improve your chances of survival if a flood occurs:

- portable radio and spare batteries
- first aid kit
- flashlights and spare batteries
- foods which require little or no cooking and no refrigeration
- blankets
- rope
- hand tools
- drinking water

Precautions taken to reduce losses from flooding are called floodproofing.

The basement walls of your home are probably not built to withstand the additional pressures of water-soaked soils. You will have less damage if you allow flood waters to come in. When you receive a flood warning, remove articles from the basement and open a basement window. Fuse boxes and other equipment should not be located in the basement.

Floodproofing for homes with adequately reinforced basement walls could include: sealing cracks in walls and floors with hydraulic cement, installation of a sump pump with a reliable power source, placing heavy screens over windows to prevent breakage from floating objects, and placing valves on main drain lines to prevent backup of water.

It is important to remember that floodproofing can help reduce damages, it does not make it safe to remain in your home during a flood.

After a flood, reenter buildings with caution. Watch for fire hazards and falling debris. Do not use appliances until they have been checked for damage. Do not use any food or water which may be contaminated.

Normal home insurance does not cover flooding. Ask your insurance agent about federally subsidized flood insurance. Not all agents handle flood insurance and you may have to contact several of them.

Many people are hurt or killed during or after a flood by their own carelessness. Know before hand what to do if a flood occurs. Your local Civil Defense Agency can help you with any questions you may have.